Amendments to the Specification:

Please replace paragraph [0003] with the following amended paragraph:

[0003] A common use for flat panel image sensors is for medical and industrial applications to detect ~~X-rays~~ x-rays. The image sensor includes a phosphorescent screen that overlays an array of image sensing elements. The phosphorescent screen converts received ~~X-rays~~ x-rays to visible light. The array receives the visible light and generates a photocurrent responsive to the light. The photocurrent is read out as data indicative of the sensed light.

Please replace paragraph [0005] with the following amended paragraph:

[0005] Manufacturing TFTs for flat panel display applications is a common process. A common use for TFTs is in active matrix liquid crystal displays (AMLCDs). Each TFT functions as a switch for a pixel in a matrix display. The voltage across each pixel is controlled independently and at a high contrast ratio. TFTs may be fabricated by depositing and patterning metals, insulators, and semiconductors on substrates through methods well known in the art. TFTs typically employ a-Si, polycrystalline ~~silicone~~ silicon, or CdSe film as the semiconductor material. A-Si is typically used in flat panel display applications as it is easily deposited on large area glass substrates at temperatures below 350 centigrade.

Please replace paragraph [0009] with the following amended paragraph:

[0009] Conventional image sensing applications have not considered the use of TFTs to detect relatively weak x-ray emissions. In order to detect x-ray emissions, the sensitivity of the imaging sensing TFT is a primary concern. Conventional devices are unable to provide adequate light detection for x-ray applications. Transparent [[TFTs]] pixels, in particular, do not provide sufficient sensor element density to detect light resulting from x-ray emissions. Thus, it would be an advancement in the art to provide a TFT image sensor with enhanced light detection

capability and suitable for x-ray applications. Such a device is disclosed and claimed herein.

Please replace paragraph [0010] with the following amended paragraph:

[0010] An image sensor array includes [[image]] photo sensors disposed on a substrate and arranged to receive and sense an image. Each [[image]] photo sensor represents a pixel for a received image. The [[image]] photo sensors each include a photo TFT that generates a photocurrent in response to the image. The photo TFT may be manufactured using common processes for TFTs in flat panel applications. The photo TFT has a gate electrode which is shorted to its source electrode to obtain a photocurrent that is substantially independent of source-drain bias. The photo TFT may also be configured with interdigitated source and drain electrodes to increase the photosensitivity. Each photo TFT is coupled to a bias line to enable operation and a storage capacitor to store a charge and discharge upon generation of a photocurrent.

Please replace paragraph [0060] with the following amended paragraph:

[0060] Acceptable scintillator materials include granular like phosphors or crystalline like cesium iodide (CsI). Phosphors glow when exposed to x-rays. Various grain sizes and chemical mixtures may be used to produce a variety of resolution and brightness varieties. CsI provides a better combination of resolution and brightness. Because cesium has a high atomic number, it is an excellent x-ray absorber and is very efficient at converting x-ray to visible light. The scintillator material may be mixed with a glue binder and coated onto plastic sheets to form the screen 50. In one embodiment the scintillator material includes relatively low cost external phosphor such as Kodak® LANEX, which has a Gd_2O_2S:Tb layer to convert ~~X-rays~~ x-rays to green light with a wavelength of 544 nm.

Please replace paragraph [0067] with the following amended paragraph:

[0067] Referring to Figure 6, a graph is shown illustrating the relative photocurrents of an a-Si photodiode and an a-Si photo TFT as an inverse function of channel length (L). The photo TFT is configured with its gate electrode 14 coupled to its source electrode 16. As illustrated, the resulting photocurrent of the photo TFT exceeds that of the photodiode for certain values of L. In the photodiode, the photocurrent 72 is proportional to the linear dimension L, whereas, in the photo TFT, the photocurrent 74 is proportional to 1/L.

Please replace paragraph [0069] with the following amended paragraph:

[0069] According to preferred embodiments, there is provided an image sensor array having a substrate with addressable pixels. Each pixel defined by a sensor element 10 has a photo TFT 12, storage capacitor 20, and a readout TFT. Each sensor element 10 is in electrical communication with a control circuit (not shown) to operate the sensor elements. The photo TFT 12 includes a doped semiconductor material that generates a current channel in response to ~~receive~~ received light and effectively discharges the storage capacitor 20.

Please replace paragraph [0071] with the following amended paragraph:

[0071] Although the photocurrent of a photo TFT can be an order of magnitude greater than a PIN diode, the dark current of a photo TFT can also be much greater than that of a PIN diode. Even when a photo TFT is operated in complete darkness a small current is still present which is referred to as a dark current. A relatively small amount of energy is sufficient to overcome the relatively low threshold of a photo TFT and create a dark current. A dark current may result from thermal activity, screen scintillation, [[filed]] field emission, and other forms of noise. A high dark current limits the dynamic range of a sensor and can potentially increase the noise at the low light levels used in [[X-ray]] x-ray radiography and fluoroscopy.

Please replace paragraph [0073] with the following amended paragraph:

[0073] The sensor element 100 further includes a dark current reference TFT 114 that is coupled to the photo TFT 102 at a pixel node 116. ~~The photo TFT 102 and the reference TFT 114 are coupled to one another at their drain electrodes 118, 120.~~ The drain 120 of the photo TFT 102 is connected to the source 118 of the reference TFT 114. The pixel node 116 has a voltage, referred to herein as the signal voltage, which is held by the storage capacitor 104 and is read out through the readout TFT 106 once per frame.

Please replace paragraph [0077] with the following amended paragraph:

[0077] The first and second bias lines 108, 124 have separate bias voltages. Although any number of bias voltages may be suitable, the first bias voltage 108 is typically ~~greater~~ smaller than the second bias voltage 124. In one implementation, the first bias voltage may be 0 V and the second bias voltage may be 10 V.

Please replace paragraph [0092] with the following amended paragraph:

[0092] The photo TFTs 402 and the storage capacitors 412 occupy most of the surface area of a sensor element 400. The relatively large size of the photo TFT 402 improves collection of visible photons generated by the ~~X-rays~~ x-rays. In some implementations, the photo TFT 402 and the storage capacitor 412 encompass 70 to 90 percent of the surface area of the sensor element 400. Furthermore, increasing the density of the sensor elements 400, and their corresponding photo TFTs 402, over a surface area improves the collection of visible photons. As the present invention is intended for direct light collection, there is no need to collect reflected light originating from below a sensor element. Accordingly, the sensor elements 400 may be opaque and disposed with very little space between adjacent sensor elements 400.

Please replace paragraph [0093] with the following amended paragraph:

[0093] Referring to Figure 13 a graph illustrating examples of generated ~~dark current~~ photocurrent 500 and ~~photocurrent~~ dark current 502 versus gate voltage in a sensor element 400 is shown. By independently biasing the gate voltage, the band bending at the gate interface can be varied. This allows the dark current to be modified over several orders of magnitude. The generated photocurrent also varies with the second voltage bias as a result of a change in the lifetime of photo-generated electrons by the band bending. The dependence of the photocurrent on gate voltage is not as strong as that of the dark current.